Art of Electronics
Exercise Solutions Chapter 1

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About

This is my personal solutions to exercises from the book Art of Electronics Third Edition. Very much appreciated if you mail me if you find errors in the solutions. My mail address can be found above this section.

Resistors

1. Assume a 5k and a 10k resistor.

   (a) The combined resistance if connecting these resistors in series is calculated by adding the resistances.

   $$R = R_{5k} + R_{10k} = 5k + 10k = 15k$$

   (b) The combined resistance if connecting these resistors in parallel can calculated in two different ways.

   $$R = \frac{R_{5k} R_{10k}}{R_{5k} + R_{10k}} = \frac{5k \times 1k}{5k + 10k} = 3.3k$$

   $$R = \frac{1}{\dfrac{1}{R_{5k}} + \dfrac{1}{R_{10k}}} = \frac{1}{\dfrac{1}{5k} + \dfrac{1}{10k}} = \frac{1k}{0.2 + 0.1} = 3.3k$$

2. We shall calculate the power dissipated when connecting a 12V car battery across a 1 ohm resistor.

   Ohm's law gives the current that will flow through the resistor.

   $$I = \frac{V}{R} = \frac{12}{1} = 12A$$

   The dissipated power is calculated by multiplying the voltage across the resistor with the current that flows through it.

   $$P = VI = 12 \times 12 = 144W$$